

# Emergency Cesarean Hysterectomy Among Women attending to Obstetric Unit in Al-Thowrah Hospital, Sana'a City, Yemen

Intisar Ali Mohammed<sup>1\*</sup>, Nabil Ahmed Al-Rabeei<sup>2</sup>

<sup>1</sup>Department of Obstetrics and Gynecology Faculty of Medicine and Health Sciences, Sana'a University

<sup>2</sup>Nursing Division, Faculty of Medicine and Health Sciences, Sana'a University.

## Abstract

**Background:** Peripartum hysterectomy is a major operation and is invariably performed in the presence of life threatening hemorrhage during or immediately after abdominal or vaginal deliveries. **Aim:** To determine the incidence and indication of cesarean hysterectomy, among women attending to the obstetric unit in Al-Thowrah modern general hospital, Sana'a City, Yemen. **Methods:** A total of 60 women cesarean underwent hysterectomy were enrolled in the study. Data were collected from labor registers, theater records, patient cases notes, ward registers and intensive care unit records. **Results:** During the period of study there were 60 cesarean hysterectomy and 54500 deliveries, representing an incidence rate of 1.1 cases per 1000. Vaginal delivery was the most common mode of delivery (83.3%) followed by a cesarean section (16.7%), and cesarean hysterectomy (0.11%). Most of the women with cesarean hysterectomy were in the age group of 30-39 years (56.7%), 23.3% of women were older than 40 years, and the least were at age group less than 30 years (20%). The majority of women were grand multipara (80%) while 16.7% were multipara and only two women (3.3%) were primigravida. Cesarean hysterectomy was performed in two-thirds of women at the gestational age of 37 weeks or more and in one third at the gestational age of less than 37 weeks. The most common indication for cesarean hysterectomy was rupture uterus (58.3%), massive hemorrhage due to the placenta (15%). Placenta previa, uterine atony, and placenta adherent were indicated in 11.7%, 8.3%, 6.7%, respectively. There were 53 stillbirths and 7 alive birth. The most common causes of death were placental abruption, ruptured uterus, and prematurity. There was 10 maternal death (16.7%) due to DIC in 6 women as a complication of massive hemorrhage and acute renal failure in 4 patients. There were 42 maternal complications. These were due to shock (bleeding) in 14, DIC in ten, anemia in eight, acute renal failure in seven, and ureteric ligation in three. **Conclusion:** The incidence of cesarean hysterectomy was very high, and the most common causes were found to be due to rupture uterus and PPH due to uterine atony and abruption placenta and placenta previa. The maternal mortality rate was found to be very high and the prenatal mortality rate also was very high.

**Keywords:** Cesarean hysterectomy, Placenta previa, uterine atony, placenta adherent, Rupture uterus.

## Introduction:

Peripartum hysterectomy has been described as catastrophic procedure and is often performed in acute life threatening emergency<sup>1</sup>. The difficulty associated with the procedure is not necessarily the surgical technique but is the support of such ill patients. These difficulties are more pronounced in developing countries when institution are inadequately founded, facilities are lacking and patients are present in the hospital very late where pathology is

advanced<sup>2</sup>.

The incidence of cesarean hysterectomy is 8.3 per 1000 cesarean<sup>3</sup>. Even today 8-10% of maternal mortality in developing countries directly occur due to massive obstetrical hemorrhage<sup>4</sup>. Maternal mortality in Yemen still unacceptably high, the majority of these deaths occur in poor illiterate women who make little use of modern obstetric care has therefore been proposed as a major necessity in the reduction of maternal mortality<sup>5</sup>. The

**Corresponding Author:** Intisar Ali Mohammed, <sup>1</sup>Department of Obstetrics and Gynecology, Faculty of Medicine and Health Sciences, Sana'a University

indication for peripartum hysterectomy includes uterine atony unresponsive to conservative measures, previous cesarean birth, laceration of major vessels, abnormal placentation, cervical dysplasia, or carcinoma in situ<sup>6,7</sup>. Vaginal birth after cesarean, primary and repeat cesarean deliveries and multiple births are independently associated with an increased risk for peripartum hysterectomy<sup>7</sup>. The association between placenta previa accrete and prior cesarean sections was confirmed, and the incidence of the placenta accrete increased as the number of previous cesarean sections increased. The patient with antepartum hemorrhage due to placenta previa, who had a previous cesarean section should be considered at high risk for developing placenta accrete<sup>3,8</sup>. The combination of high parity, cesarean section, prior cesarean delivery, current placenta previa and oxytocin use for uterine stimulation were among the risk factors for uterine atony and should alert the obstetrician that an emergency peripartum hysterectomy may be needed<sup>3,9</sup>. Risks of the cesarean hysterectomy include increased operative time, blood loss, increased rate of infection, and higher contaminated incidence of damage to bladder and ureters than in non-gravid hysterectomy or cesarean section alone<sup>10</sup>. In addition, the cervix is not easily identified in a labored uterus and may not be completely excised at the time of cesarean hysterectomy.

#### **Aim of the study:**

to identify the incidence and indications of cesarean hysterectomy among women attended to the obstetric unit in Al-Thowrah modern general hospital, Sana, a city, Yemen.

#### **Subjects and methods**

This is descriptive cross-sectional study was done among patients who had a cesarean hysterectomy at Al-Thowrah modern general hospital (TMGH) from January 2009 to December 2013. This study carried out in TMGH, The hospital is the largest public and referral center in Yemen, and it receives all obstetric emergency cases referred from different locations. The department of obstetrics and

gynecology has all facilities that serves the patients including blood bank, laboratory and a well expert staff. The obstetric unit which was the core of our collected data and information, this unit consists of the antenatal ward, post-natal ward, Operation Theater of Gynecology ward and labor room which contains four delivery beds and eight beds for post-delivery observation, and the dark room contains two beds and qualified operation room for complicated cases. The data were collected from the patients' files using checklist. The demographic characteristics, incidence, indications and outcomes of hysterectomy, peripartum complications, the parity, causes of cesarean hysterectomy, Type of hysterectomy, Causes of maternal mortality, and fetal mortality were evaluated.

Peripartum hysterectomy is the surgical removal of the uterus at the time of a planned or unplanned cesarean delivery or in the immediate postpartum period. Maternal age in years from age 16 years up to 45 years. Parity is the number of deliveries the mother had before. Gestational age is the duration of pregnancy in weeks 24 to 40.

A total hysterectomy is the surgical removal of the uterine corpus with its cervix. Subtotal hysterectomy is the surgical amputation of the uterine corpus from its cervical stump. Rupture uterus is a tear involves layer or all layers of the uterus. Abruptio placenta is the separation of a normally implanted placenta from its site of implantation. Placenta previa is the abnormal implantation of the placenta in the lower uterine segment either over or near the internal os of the cervix. Uterine atony: is the inability of the uterine myometrium to contract effectively after delivery. Placenta accrete is the placenta villi attached to the myometrium. Placenta percreta is the placenta villi penetrate through the entire layer of the myometrium. Maternal mortality is the death of any women dying due to cause whilst pregnant or within 42 days after termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes. Maternal morbidity is the complication

that developed in the patient who underwent cesarean hysterectomy as hemorrhage, DIC, acute renal failure, shock, paralytic ileus, intestinal obstruction, ligation of ureter and anemia. Data was analyzed by using SPSS version 19 for frequency and cross tabulation.

## Results

There were 54,500 deliveries, 45375 normal vaginal deliveries, 9125 cesarean deliveries and 60 emergency cesarean hysterectomies, representing an incidence rate of 1.1 cases per 1000. (Table-1).

The age of the patients ranged from (16-45 years). The highest percentage of cesarean hysterectomy was found among the age group 30-39 years 34 patient (56.7%), then in age group 40yrs or more, there were 14 patients (23.3%), followed by age group 20-29 yrs. 10 patients (16.7%), the lowest percentage was in age group >20years 2 patient(3.3%), (Table-2).

Most cases of cesarean hysterectomy were found among grand multipara (5 and more) 48 patients (80%), there were 2 patients primigravida (3.3%) had a cesarean hysterectomy due to improper use of oxytocin and obstructed labor (Table-3).

The majority of patient 40 (66.7%) who had cesarean hysterectomy were pregnant  $\geq 37$  weeks, while a minority 20 patients (33.3%).who underwent a cesarean hysterectomy at gestational age>37 weeks (Table -4).

Figure 1 shows that 14 cases (23.3%) of patient of cesarean hysterectomy suffered from shock, and 10 cases (16.7%) suffered from DIC, and 7cases (11.7%) suffered from acute renal failure and 8 cases (13.3%) suffered from anemia and finally 3 cases (5%) complicated by ureteric ligation during operation,18 cases (30%) passed without complication.

Table 1: Distribution of modes of delivery among women (No=54,500).

Mode of delivery	F	%
• Cesarean section	9125	16.7
• Cesarean hysterectomy	60	0.11
• Vaginal delivery	45500	83.3
<b>Total</b>	<b>54,500</b>	<b>100</b>

Table 2: Distribution of cesarean hysterectomy according to age (No=60).

Age group	F	%
• <20 years	2	3.3
• 20-29 years	10	16.7
• 30-39 years	34	56.7
• 40 years	14	23.3
<b>Total</b>	<b>60</b>	<b>100</b>

Table 3: Distribution of cesarean hysterectomy according to parity. (No=60).

Parity	F	%
• Primigravida	2	3.3
• 2-4	10	16.7
• $\geq 5$	48	80
<b>Total</b>	<b>60</b>	<b>100</b>

Table 4: Distribution of cesarean hysterectomy according to gestational age (No=60).

Gestational age	F	%
• < 37 weeks	20	33.3
• $\geq 37$ weeks	40	66.7
<b>Total</b>	<b>60</b>	<b>100</b>

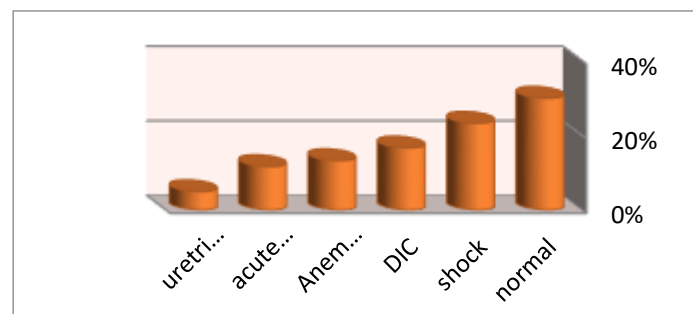


Figure 1: Distribution of cesarean hysterectomy according to maternal complications (No=60).

The most common causes of cesarean hysterectomy was rupture uterus 35 patients (58.3%), followed by abruption placenta 9 patients (15%), then placenta previa 7 patients (11.7%) and uterine atony 5 patients (8.3%), then placenta adherent 4 patients (6.7%), (Table-5).

Thirty-one women (51.7%) had a total abdominal hysterectomy; whereas as 29 women (48.3%) had a subtotal hysterectomy (Table -6).

As regard to fetal outcome this study revealed that the stillbirth was reported in 53 (88.3%), (Table 7).

The maternal death during and after operation were 10 cases (16.7%), the most common cause was disseminated intravascular coagulation (DIC) 6 cases (0.10%), followed by acute renal failure 4 cases (0.07%), (Table 8).

**Table-5: Causes of cesarean hysterectomy (No=60).**

Causes	F	%
• Rupture uterus	35	58.3
• Abruptio placenta	9	15
• Placenta previa	7	11.7
• Uterine atony	5	8.3
• Placenta adherent	4	6.7
<b>Total</b>	<b>60</b>	<b>100</b>

**Table 6: Type of hysterectomy (No=60).**

Type of hysterectomy	F	%
Subtotal hysterectomy	29	48.3
Total hysterectomy	31	51.7
<b>Total</b>	<b>60</b>	<b>100</b>

**Table 7: Fetal outcome (No=60).**

Fetal outcome	F	%
• Alive	7	11.7
• Stillbirth	53	88.3
<b>Total</b>	<b>60</b>	<b>100</b>

**Table 8: Causes of maternal mortality (No=10).**

Cause of death	F	%
• DIC	6	60
• Acute renal failure	4	40
<b>Total</b>	<b>10</b>	<b>100</b>

## Discussion

During the period of study, there were 54500 deliveries and 60 cesarean hysterectomies, representing an incidence rate of 1.1 cases per 1000. The rate is higher than that of the earlier studies conducted by Yamani Zamzami at king Abdull Aziz Hospital in Sudia Arabia where 17

hysterectomies among 34379 deliveries were reported from 1991-2002 with a rate of 0.5 per 1000 deliveries<sup>11</sup>. El-Jallad MF<sup>12</sup> at the princess Badeea Hospital in Jordan identified 61 cesarean hysterectomies among 70252 deliveries between 1994-2002 giving a rate of 0.87 per 1000 deliveries, whereas Smith J described 14 cesarean hysterectomies in 50000 deliveries from 1988-2003 giving a rate of 0.36 per 1000 deliveries<sup>13</sup>. At Sveti –Duh general hospital<sup>14</sup>, Zagreb, Croatia, Habek D and Becarevic R reported 17 cesarean hysterectomies among 21659 deliveries from 1990-2003 giving a rate of 0.078%. At Winthrop University Hospital, Mineola, New York, Kastner ES, Figueroa R, Garry D, Maulik D, reported 48 cesarean hysterectomies among 34241 deliveries from 1991-1997 giving a rate of 1.4 per 1000 deliveries<sup>15</sup>. Syed N at Lalla-Ded hospital in Kashmir, India, describes 146 cesarean hysterectomies among 55599 deliveries from 2001-2002 giving a rate of 2.6 per 1000 deliveries which are higher than that in our study<sup>16</sup>.

This study shows that, up to 56.7% of women with cesarean hysterectomy were in age group 30-39 years, 23.3% of 40 years of age or greater, 16.7% of age group 20-29 years, and finally 3.3% of >20 years. Similar trends were observed by Syed Nasser Ahmed, reported that up to 60% of patients undergoing hysterectomy were in age group of 30-34 years, followed by 42% of 35-39 years. Selo-Ojeme DO and co-workers in their study in Royal-free hospital, Pond Street, London UK (1993-2003), reported that mean age was 37 years 75%, followed by 29 years<sup>8</sup>. This study shows that 80% of cesarean hysterectomy was performed for a patient with para 5 or more, followed by 16.7% for para 2-4, and 3.3% performed for primipara. Yamani Zamzami 1991-2002 in his study show that high parity was identified as a risk factor and 17.6% was performed for primipara<sup>8,11,17</sup>. Syed Nasser Ahmed reported 64% of patients undergoing cesarean hysterectomy belonged to para 3 or above and 3% performed for primipara<sup>16</sup>. Habek and co-workers described that most hysterectomies were carried out in

multipara 70.5% and 29% in primipara<sup>14</sup>. Barclay in 1975 showed that 82.65% of patients undergoing cesarean hysterectomy were para 2 or greater<sup>18</sup>. Our study results runs in conformity. In this study the most common cause of cesarean hysterectomies was rupture uterus 58.3% followed by abruption placenta 15%, placenta previa 11.7%, uterine atony 8.3% and placenta accrete\percreta 8.3%. Syed Nasser A<sup>16</sup> reported that uterine rupture was the most common cause of cesarean hysterectomy 58.3% which is consistent with our study. Faheem Z in his study reported that 27.9% of cesarean hysterectomy was done for uterine rupture<sup>12</sup>. Yucel O, Ozdemir I, Yucel N, and Somunkiran A in their study reported that 35% of cesarean hysterectomies were carried out for rupture uterus<sup>17</sup>.

Two study by Mc-Mahon 1996 and Miller 1997 and their colleague's, they reported that 10-20% of women complicated with rupture uterus underwent hysterectomies<sup>19</sup>. At Osijek clinical Hospital in Croatia, there was one study reported that 11.7% of hysterectomies were performed due to rupture uterus<sup>14</sup>. The rate of uterine rupture in these studies was between 10-35% which is lower than that figure reported in our study (58.3%). The explanation of higher rate of uterine rupture in the present study could be due to most patients are poor illiterate, low socioeconomic status, high parity, the trial of labor at home with a traditional method with or without previous deliveries, no antenatal care and transfer patient to hospital at late stage especially from a rural area. This study shows that 15% of patients complicated by antepartum hemorrhage were due to abruption placenta underwent a cesarean hysterectomy. This incidence rate is slightly higher than incidence rate in a study carried out by Syed N<sup>16</sup> at Lalla-Ded hospital in Kashmir for 2 years period reported that 12% of patients complicated by abruption placenta underwent a cesarean hysterectomy. Also, this study shows that 11.7% of women complicated by antepartum hemorrhage due to placenta previa underwent a cesarean hysterectomy. Syed N<sup>16</sup> reported 25% of cesarean hysterectomy was due to placenta previa.

At Winthrop University Hospital, Kastner and co-workers<sup>15</sup> in their study reported that 25% of cesarean hysterectomies were indicated for placenta previa. Another study in Croatia<sup>14</sup> showed that 33% of hysterectomies were performed due to placenta previa. A lower rate of placenta previa was reported in our study. From this study, we found that 8.3% of women complicated by hemorrhage due to uterine atony ended by cesarean hysterectomy. Yamani Z<sup>11</sup> in his study in Saudi Arabia reported that 64.7% of hysterectomies were carried out due to uterine atony. Another study<sup>13</sup> reported that 28% of hysterectomies were carried out due to uterine atony. Study of Faheem Z<sup>12</sup>, showed that 21.3% of cesarean hysterectomy was indicated for uterine atony. Syed N reported 21% of cesarean hysterectomy were performed due to uterine atony<sup>16</sup>. Another study was done in New York at Winthrop-University hospital, and this study reported that 29.8% of cesarean hysterectomies were carried out due to uterine atony<sup>15</sup>. All incidence rates in these studies are higher than incidence rate in our study. This study show that 6.7% of cesarean hysterectomy had been done due to placenta\percreta. Faheem Z<sup>12</sup> reported that morbidly adherent placenta accreta \percreta was the most common indication for cesarean hysterectomy (47.5%). Yamani Z<sup>11</sup> reported 35.3% of morbid adherent placenta was the common indication for cesarean hysterectomy. Smith j described 28% of hysterectomies was performed for placenta accrete<sup>13</sup>.

At Stony Brook University hospital, New York, Bakshi S, Meyer BA<sup>20</sup> (1990-1995) reported that placenta accrete was identified as a risk factor for peripartum hysterectomy. At the hospital in Chojnice<sup>21</sup>, the study was performed from 1992 to 2002 reported that placenta accrete was the most common indication of cesarean hysterectomy and had an incidence of 48.4%. Yucel O and Co-workers<sup>17</sup> in their study reported that 29% of cesarean hysterectomy was done due to placenta accrete. Other study done at Osijek clinical hospital in Croatia<sup>14</sup>,



reported that about 33% of cesarean hysterectomies had been done due to placenta percreta. The incidence rate in these studies is higher than incidence rate in our study. This study shows 51.7% of patients underwent a total hysterectomy and subtotal hysterectomy was performed in 48.3%. Faheem Z<sup>12</sup> reported that 64% underwent a total hysterectomy and 36% were subtotal hysterectomies. Ozdemir I and co-workers<sup>17</sup> reported that about 70.5% of hysterectomies were total and 29.4% were subtotal hysterectomies. Yamani Z<sup>11</sup> in his study reported that total hysterectomy was performed in 53% and subtotal hysterectomies were performed in 47%. One study at Osijek hospital in Croatia<sup>14</sup> reported that 94% of hysterectomies were total and 5.8% of hysterectomies were subtotal. Our study runs in confirmatory. During the period of this study, the prenatal mortality was very high, there were 53 (88.3%) stillbirth, and most causes of death due to abruption placenta, rupture uterus and prematurity. Faheem Z<sup>12</sup> in his study reported that 7 (11.5%) cases of stillbirth and 4 (6.6%) cases of early neonatal deaths. Sayed N reported 43% of prenatal mortality in his study<sup>16</sup>. In Abant Izzet Baysal University, Turkey, one study reported that among 34 cases underwent cesarean hysterectomy, there were 6 (17.8%) stillbirth and 2 (5.8%) early neonatal death<sup>17</sup>. Becarevic R, Habet D<sup>14</sup>, in their study reported that among 17 cases of cesarean hysterectomy there was only 1 (5.8%) stillbirth. Other study<sup>22,23</sup> showed that the prenatal mortality rate associated with abruption placenta was 12%. But in most reports<sup>24</sup>, prenatal mortality in 25% of cases was associated with abruption placenta. Reports by Anarth and Co-workers<sup>25</sup> described that about 40% of prenatal death due to prematurity. During the period of this study, the most common complication of cesarean hysterectomy was shock (23.3%), disseminated DIC (16.7%), acute renal failure (11.7%), anemia (3%), ureteric ligation (5%) and 30% of a patient discharged in good condition. In USA<sup>26</sup> hemorrhage remains the third most common cause of maternal mortality and morbidity. In Saudi Arabia at King

Abdull Aziz hospital<sup>11</sup> one study 1991-2002 reported that 53% of patients developed DIC and 6% had bilateral ureteric ligation after cesarean hysterectomy. Other study done in Sveti Duh, General hospital, Zagreb<sup>14</sup> 1995-2003 reported that 25% of patients complicated by shock after cesarean hysterectomy.

This study shows that maternal death during and after cesarean hysterectomies were 10 cases (16.7%) which was very high because most of these patients present to hospital very late where pathology is advanced and facilities are lacking institutions are inadequately founded, facilities are lacking, lacking workers who identifying high-risk pregnancies and their timely referral, most patients presented to the hospital in advanced stage due to the improper mechanism of referral to a higher hospital and lacking qualified and specialist surgeons.

Causes of death were respectively due to DIC 60%, acute renal failure 40%. Faheem Z<sup>12</sup> and Syed N<sup>16</sup> reported that 3% of maternal mortality during their study period. In the USA the maternal mortality after cesarean hysterectomy was very low, there were 3 studies in California and Massachu<sup>27</sup> sets were reported that the rate is 3.2 per 100,000 (1 in 310). Yucel O, and Co-workers<sup>14</sup> reported that in their study, the rate of maternal mortality following cesarean hysterectomy were 5.9%. Several studies show that no maternal mortality after cesarean hysterectomy<sup>11,15,21</sup>.

### Conclusion

This study shows a high incidence of cesarean hysterectomy due to conservative surgery as ligation of internal iliac or uterine arteries or B-Lynch Brace suture not performed to stop bleeding. Uterine rupture still is the leading cause and the main indication for cesarean hysterectomy, high parity, current placenta previa, uterine atony, accidental hemorrhage and placental adherent are identified as risk factors for cesarean hysterectomy and should alert the obstetrician that an emergency cesarean hysterectomy may need. The prenatal mortality is very

high due to abruption placenta, uterine rupture, and prematurity.

### Recommendations

Improvement in ANC services and identifies high-risk cases and their reference to appropriate referral hospitals. Reevaluated our ANC and delivery services with a view to cover an area that lacks such services and improved the available.

### References

- 1.Langdane FM, Geary w, Haw W, and Keane D. Peripartum hysterectomy in 1990: any new leasion. Jornal of Obstet and Gyne 2001; 21:121-123.
- 2.Lawson JB, Harrison KA, Bergstrom S. Organization of maternity care in developing countries. London: Bahasker-Rook 2001; 2: 21-28.
- 3.Depp R. Cesarean delivery. In: Gabbe SG, Niebyl JR, Simpson JL. Obstetrics: Normal and problem pregnancies. 4th. New York City (NY): Churchill Livingstone 2002; 539–606.
- 4.Rao SB, Shah PK, Dholakia S, Shreyan N, Vanjara N. Emergency hysterectomy: The Hobson's choice in massive atonic postpartum hemorrhage. Bombay Hosp J. 2001;43(2).
- 5.Fathe MF. imagine a world where mother head is safe for all women. International Journal of Gyn and Obst 2001; 72: 207-213.
- 6.Bixby GH. Extirpation of the puerperal uterus by abdominal section. J Gynecol Soc Boston 1986; 1: 223-232.
- 7.Speert H, Eduardo Porro. Cesarean hysterectomy. Surg Gynecol Obstet 1958; 106: 245.
- 8.Selo-Ojeme DO, Bhattacharjee P, Izuwa-Njoku NF, Rezan AK. Emergency peripartum hysterectomy in a tertiary London hospital. Arch Gyne Obstet 2005;271:154-158.
- 9.Whiteman MK, Kuklina E, Hillis SD, Jamieson DJ, Meikle SF, Posner SF, et al. Incidence and determinants of peripartum hysterectomy. Obstet Gynecol 2006; 108: 1486–92.
- 10.Haeeris JW. A study of the results obtained in sixty four cesarean section terminated by supravaginal hysterectomy. Bull John Hopkins Hosp 1922; 33: 318.
- 11.Yamani Zamzami TY. Indication of emergency peripartum hysterectomy. Arch Gynecol Obstet 2003; 268(3) : 131-5.
- 12.El-Jallad MF, Faheem Zayed , Hala S Al-Rimawi. Emergency Peripartum Hysterectomy in Northern Jordan: Indications and Obstetric Outcome (An 8-Year Review). Arch Gynecol Obstet 2003; 270(4): 271-273.
- 13.Smith J, Mousa HA. Peripartum hysterectomy for primary postpartum haemorrhage: Incidence and maternal morbidity. Journal of Obstetrics and Gynaecology 2007; 27(1):b44-47.
- 14.Habek D, Bečarevič R. Emergency Peripartum Hysterectomy in a Tertiary Obstetric Center: 8-Year evaluation. Fetal Diagn Ther 2007; 22(2): 139–142.
- 15.Kastner ES, Figueroa R, Garry D, Maulik D. Emergency peripartum: experience at a community teaching hospital. Obstet Gynecol 2002; 99: 971–975.
- 16.Amad SN, Mir IH. “Emergency peripartum hysterectomy: Experience at Apex Hospital of Kashmir Valley,”. Internet Journal of Gynecology & Obstetric 2007; 8(2).
- 17.Yucel O, Ozdemir I, Yucel N, Somunkiran A. Emergency peripartum hysterectomy. Arch Gyne Obstet 2006; 274(2): 84-87.
- 18.Barclay DL, Hawkins BL, Freuh DM. Elective cesarean hysterectomy: a five year comparison with cesarean section. Am J Obstet Gynecol 1976; 124(8): 900-911.
- 19.Cunningham FG, MacDoland PC, Gant NF, Leveno KG, et al. Cesarean hysterectomy. Williams obstetrics 23th edition. 2010.
- 20.Bakshi S, Meyer BA. Indication for and outcome of Emergency peripartum hysterectomy. J Rep Med 2000; 45(9): 733-737.
- 21.Cieminski A, Długolicki F. Placenta Previa Accreta. Ginekol Pol 2004; 75(12): 919-25.

- 22.Dombrowski MP, Wolf HM, Welch RA. Cocaine abuse in associated with abruption placenta and decreased birth weight, but not shorter labor Obstet Gynecol 1991; 17: 139.
- 23.Hibbard BM, Jeffcoate TNA Abruption placenta. Obstet Gynecol 1966;v27:155-67.
- 24.Cunningham FG, MacDoland PC, Gant NF, Leveno KG, et al. Obstetric hemorrhage. Williams obstetrics 23th edition 2010; 25
- 25.Ananth CV, Berkowitz Ts, Savitz DA, et al. Placental abruption and adverse perinatal outcome. JAMA 1999; 282: 1646-51.
- 26.Kauntiz AM, Hughs JM, Grimes DA, et al. Causes of maternal mortality in the US. Obstet Gynecol 1985; 65: 605.
- 27.Steven GG, Jennifer RN, Simpson JL. Obstetrics normal and problem pregnancies. 2004